A STUDY OF PHYSICAL FITNESS IN GRADES FOUR, FIVE, AND SIX OF THE NORTH KANSAS CITY PUBLIC SCHOOLS

By

WILLIAM JAY STINSON

A. B., William Jewell College, 1966

A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Physical Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1970

Approved by:

Major Professor

THIS BOOK CONTAINS NUMEROUS PAGES WITH THE PAGE NUMBERS CUT OFF

THIS IS AS RECEIVED FROM THE CUSTOMER

ACKNOWLEDGMENTS

The author is indebted especially to Mr. Raymond A. Wauthier, Associate Professor of Physical Education, for his time and efforts in guiding and advising me in the writing of this report. Also, thanks to Professor T. M. Evans, Head of the Physical Education Department of Kansas State University, for his professional assistance in this study.

TABLES OF CONTENTS

PAGE

LIST OF TABLES

INTRODUCTION

Every educational program realizes the importance of tests to aid the admistrators in determining the value of the activities offered in that program. ". . . they provide information which helps teachers and administrators judge the effectiveness of programs and teaching methods."[1] Physical education is no exception.

The elementary physical education curriculum in the North Kansas City Public Schools did not advocate the grading of pupils on skills learned. This non-grading approach was due to the lack of class time for instruction and the utilizing of one physical education teacher for approximately 1,200 students. The elementary physical education department decided to adopt a physical fitness testing program to give the students some idea of their degree of physical fitness, and also, to give the department some assistance in determining what the students' needs were.

In beginning a program of standardized testing, North Kansas City received permission to adopt six items and their standard scores from a test of ten items administered to the elementary pupils of the Kansas City, Missouri School District. After administering this test for two years to over 15,000 pupils of the fourth, fifth, and sixth grades, North Kansas City decided to establish their own norms to determine if there were significant differences between the two standards. It was reasoned that the results of a test were more meaningful if the test had been administered in similar circumstances. Therefore, if the same group of teachers administered a test

---

[1] Clyde Knapp and E. Patricia Hagman, Teaching Methods For Physical Education (New York: McGraw-Hill, 1953), p. 360.

for two consecutive years under relatively similar conditions (facilities and programs), it was a more representative test than that of using another district's norms to evaluate the district's own program.

This report was derived from data collected from each individual teacher and the results of this data were compared to the existing set of standards. In addition to establishing new standards, recommendations for a better program of testing have been cited from personel experience and research.

The Situation

Before delving into a description of the test and the results of the North Kansas City scores in comparison to the adopted test from the Kansas City, Missouri School District, it was necessary to understand the general situation of elementary physical education in North Kansas City and to compare its operation with that of Kansas City's at the time of the testing. This understanding clarified the need for the district to have its own standards.

Both the North Kansas City Public Schools and the Kansas City, Missouri School District classified the elementary physical education teacher as a special teacher. This meant that the teacher traveled from one school to another both as an activity teacher and as a consultant. At the time of the testing period (1967-1969), each teacher in North Kansas City was scheduled to meet with each class (grades one to six) once a week for 25 to 30 minutes. This time allotment varied in individual schools due to their particular schedules. On the other hand, Kansas City teachers met with each class once every two weeks for a 30 minute period of instruction.

The Problem

This study was undertaken to determine the status of physical fitness of the children in grades four, five, and six of the North Kansas City Public

Schools as compared to the physical fitness of the pupils of similar grades in the Kansas City, Missouri School District.

METHOD OF STUDY

General Information

The test consisted of six items--shuttle run, thirty-five yard dash, push-ups, sit-ups, shoot the cannon, and the standing broad jump. A rule sheet was distributed to each elementary physical education teacher which described each item and its testing procedures. Each item was demonstrated in advance of the test to assure the student's familiarity with its correct form. The test was administered to grades four, five, and six over a period of four to six weeks in the Spring depending upon class time allotments and weather conditions. There were awards given to those scoring very high on the test.

Description of Items

The rule sheet mentioned in the previous paragraph was distributed in the form of a handbook for elementary self-testing. Its entirety was adopted from the Kansas City, Missouri School District. The handbook has been included in the appendix of this report.

Both the shuttle run and the thirty-five yard dash were timed to the nearest tenth of a second and each participant was given two chances with the fastest time being recorded as his (or her) score. A one minute time limit was imposed on the push-up, sit-up, and shoot the cannon with emphasis being placed on the correctness of their execution. The standing broad jump was measured in inches and the pupil was given two trials with the longest jump counting.

Completion of Test

After the test had been completed, the scores were recorded on individual score cards which, in turn, were given to each student who participated in the test. This score card was to be taken home to the parents. It included not only the child's scores but also an explanation of the purpose of each item on the test, and a table of percentiles with scores grouped accordingly so that the child and parent could evaluate the performance of the child. A sample copy of that score card has been included in the appendix.

There was an award system for high performances. Each child who attained the 90th percentile in at least five of the six items was awarded a certificate upon completion of the test.

Definitions of Test Terms

Certain words were used during the discussion of the test results for simplicity in expression. Their meanings were as follows:

Item. General term used to describe an event or activity comprising part of the test.

Repetition. One complete execution of a test item.

Old Standard. This refers to the standards adopted from the Kansas City, Missouri School District.

New Standard. The standard computed from the performances of the pupils in the North Kansas City Public Schools during 1967-1969.

The Handbook for Elementary Self-Testing was placed in the appendix for detailed descriptions of each test item.

TEST RESULTS

The test results were arranged by test items. Discussions of the test performances and tables illustrating each item were arranged by grade levels

and categorized as boys or girls. Both the Kansas City, Missouri School District and the North Kansas City Public Schools standards are shown for comparison in these tables.

SHUTTLE RUN

The shuttle run was run either as individuals or in pairs. Thirty feet from the starting line, two blocks were placed three feet apart for each runner. Two complete trips were necessary to pick up and bring the blocks back (one at a time) to the starting line. Each participant was given two trials with the fastest time (to the nearest tenth of a second) recorded as that person's time.

TABLE I

A COMPARISON OF STANDARD TIMES IN THE SHUTTLE RUN FOR GRADE FOUR

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	10.5	10.4	11.2	10.8
80-89	10.7	10.6	11.4	11.1
70-79	11.2	10.8	11.8	11.3
60-69	11.4	11.0	12.0	11.5
50-59	11.7	11.2	12.2	11.7
40-49	11.9	11.4	12.4	11.9
30-39	12.0	11.7	12.6	12.2
20-29	12.3	12.0	13.1	12.7
10-19	12.4	12.5	13.2	12.9

Grade Four

Boys. The new standards increased the 90th percentile one-tenth of a second (10.4). There was a variance of three to five-tenths of a second faster for the new standards in the percentiles from 30 to 70.

Girls. The entire table showed a three to five-tenths of a second variance of the percentile scores between the standards with the new one having the fastest times throughout the test. The 90th percentile showed a very great decrease for the new standard of four-tenths of a second (10.8).

TABLE II

A COMPARISON OF STANDARD TIMES IN THE SHUTTLE RUN FOR GRADE FIVE

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	10.4	10.2	10.9	10.6
80-89	10.6	10.4	11.1	10.9
70-79	11.0	10.6	11.6	11.1
60-69	11.2	10.8	11.8	11.2
50-59	11.4	11.0	12.0	11.5
40-49	11.6	11.4	12.2	11.7
30-39	11.7	11.5	12.5	12.0
20-29	12.0	12.0	12.9	12.3
10-19	12.1	12.3	13.1	12.7

Grade Five

Boys. The new standard bettered the 90th percentile of the old standard by two-tenths of a second (10.2 to 10.4). From the 40th to the 75th percentile the range of variance was at least two-tenths of a second. The new standards ranged from two to four-tenths of a second faster than the old ones. They coincided at the 20th percentile with an elapsed time of 12.0 seconds.

Girls. A decrease of three to six-tenths of a second in the percentile scores was prevalent in the new standards. The greatest variance was at the 60th percentile with times of 11.2 (new) and 11.8 (old) seconds. The 90th percentile new standard was 10.6 seconds as compared to 10.9 seconds in the old one.

TABLE III

A COMPARISON OF STANDARD TIMES IN THE SHUTTLE RUN FOR GRADE SIX

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	10.0	10.1	10.4	10.3
80-89	10.2	10.2	10.7	10.6
70-79	10.5	10.4	11.3	10.8
60-69	10.7	10.6	11.6	10.9
50-59	10.9	10.7	11.8	11.0
40-49	11.1	10.9	12.0	11.3
30-39	11.3	11.1	12.2	11.5
20-29	11.7	11.5	12.6	11.8
10-19	11.9	11.9	12.8	12.5

With the exception of the 80th and 90th percentiles, of the sixth grade girls, the girls new standards in all grades showed decreases in time ranging from three to eight-tenths of a second. The boys new standards were slightly lower in variance (fourth grade--two to four-tenths, fifth grade--three to five-tenths) with sixth grade showing only slight variance at all.

THIRTY-FIVE YARD DASH

The thirty-five yard dash was timed to the nearest tenth of a second with each participant allowed two trials of which the fastest one was recorded. The pupils ran in pairs or as individuals.

TABLE IV

A COMPARISON OF STANDARD TIMES FOR THE THIRTY-FIVE YARD DASH IN GRADE FOUR

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	5.4	5.5	5.4	5.6
80-89	5.5	5.6	5.8	5.8
70-79	5.7	5.8	6.0	6.0
60-69	5.8	5.9	6.2	6.1
50-59	5.9	6.0	6.4	6.2
40-49	6.0	6.2	6.6	6.4
30-39	6.1	6.3	6.9	6.5
20-29	6.3	6.5	7.1	6.8
10-19	6.7	6.8	7.4	7.1

Grade Four

Boys. The old standards were generally one-tenth of a second faster throughout the percentiles. The exception was the percentiles from the 20th to the 40th where the variance was two-tenths of a second.

Girls. The old standard 90th percentile mark was two-tenths of a second (5.4 to 5.6) faster than the new one. However, both standards were the same at the 70th and 80th percentiles with the new one having times up to a maximum of four-tenths of a second faster after the 70th percentile.

TABLE V

A COMPARISON OF STANDARD TIMES FOR THE THIRTY-FIVE YARD DASH IN GRADE FIVE

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	5.3	5.3	5.4	5.5
80-89	5.5	5.5	5.8	5.8
70-79	5.7	5.6	6.0	5.9
60-69	5.8	5.8	6.1	6.1
50-59	6.0	5.9	6.3	6.3
40-49	6.1	6.1	6.4	6.4
30-39	6.2	6.3	6.6	6.6
20-29	6.4	6.5	6.8	6.8
10-19	6.7	6.7	7.0	7.1

Grade Five

Boys. Both standards coincided at the 80th and 90th percentiles, and four times thereafter in the table. The variance between each standard was

was not more than a tenth of a second at any one time.

Girls. The standards were the same from the 60th to the 20th percentile with the other percentiles showing just minimum differences of one-tenth of a second.

TABLE VI

A COMPARISON OF STANDARD TIMES FOR THE THIRTY-FIVE YARD DASH IN GRADE SIX

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	5.0	5.1	5.2	5.4
80-89	5.3	5.4	5.4	5.7
70-79	5.5	5.5	5.7	5.8
60-69	5.7	5.6	5.9	6.0
50-59	5.8	5.7	6.0	6.1
40-49	6.0	5.8	6.2	6.2
30-39	6.1	6.0	6.4	6.4
20-29	6.3	6.3	6.7	6.6
10-19	6.6	6.5	7.0	6.9

Grade Six

Boys. The 90th and 10th percentile old standards were one-tenth of a second faster but the new ones were slightly faster through the mid-range of the standards. The greatest variance was two-tenths of a second at the 40th percentile.

Grade Six

Girls. An increase of two and three-tenths of a second in the 90th and 80th percentile scores, respectively, of the new standards was the most significant fact in this group. The rest of the percentiles showed slight differences both ways.

The old standard times were generally faster in the high percentiles with slight differences throughout the rest of the percentiles. The greatest change was recorded by the fourth grade girls in the 10th to 50th percentiles of the new standards. These new standards were between two and four-tenths of a second faster. Overall, both standards coincided a great deal with each other.

PUSH-UP

There was a one minute time limit for the push-up test. The pupil had to keep moving without resting in order to utilize the entire time allotment. The arms had to be fully extended when coming up and the chest had to touch the floor for a push-up to be recorded.

TABLE VII

A COMPARISON OF STANDARD SCORES FOR THE PUSH-UP IN GRADE FOUR

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	19	24	15	18
80-89	16	18	12	13
70-79	14	17	10	13

TABLE VII (continued)

Percentile Range	Boys		Girls	
	Old	New	Old	New
60-69	12	15	8	6
50-59	10	12	7	4
40-49	8	9	5	3
30-39	7	7	4	2
20-29	4	4	2	1
10-19	1	2	1	0

Grade Four

Boys. The new standards showed marked increases of two to three repetitions between the 50th and 80th percentiles. At the 90th percentile, there was a difference of five repetitions (new--24, old--19).

Girls. From the 30th to the 60th percentile, the old standards were two to three repetitions better. Both standards became closer to each other until the new standards exceeded by one at the 80th percentile. The 90th percentile new standard exceeded the old one by four.

TABLE VIII

A COMPARISON OF STANDARD SCORES FOR THE PUSH-UP IN GRADE FIVE

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	20	25	13	17
80-89	17	21	11	13

TABLE VIII (continued)

Percentile Range	Boys		Girls	
	Old	New	Old	New
70-79	15	17	9	9
60-69	13	14	8	6
50-59	11	12	7	4
40-49	9	9	5	3
30-39	8	6	4	2
20-29	5	4	2	1
10-19	2	1	1	0

Grade Five

Boys. The old standards slightly exceeded the new ones until they coincided at the 40th percentile. From then on, the new ones gradually increased to a difference of two at the 70th percentile and finally to a difference of five at the 90th percentile.

Girls. The old standards exceeded the new ones by one to three repetitions up to the 70th percentile where they coincided. The new ones showed an increase of two and four at the 80th and 90th percentiles, respectively.

TABLE IX

A COMPARISON OF STANDARD SCORES FOR THE PUSH-UP IN GRADE SIX

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	22	28	12	17
80-89	18	24	10	13
70-79	16	22	8	11
60-69	14	18	7	8
50-59	12	15	6	5
40-49	10	12	5	3
30-39	8	9	4	2
20-29	6	5	2	1
10-19	2	2	1	0

Grade Six

Boys. The new standards showed higher scores beginning at the 40th percentile and proceeding with a difference of six repetitions from the 70th to the 90th percentile.

Girls. The old standards showed an increase of one to two repetitions up to and including the 50th percentile. Proceeding from there, the new standards showed an increase of three repetitions at the 70th and 80th percentiles. The new 90th percentile increment was five repetitions.

Generally, the old standards had slightly better scores in the lower half of the percentiles. However, there was a very marked increase in the new standards over the old ones in the upper percentiles. The 90th per-

centile new standards ranged from four to six repetitions more than those of the old standards.

SIT-UP

The sit-up test had a one minute time allotment. The pupil had to keep his hands behind his head and touch one or both knees with his elbows when coming up to have a sit-up recorded.

TABLE X

A COMPARISON OF STANDARD SCORES FOR THE SIT-UP IN GRADE FOUR

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	25	32	21	34
80-89	22	29	18	29
70-79	20	27	16	26
60-69	18	25	15	23
50-59	16	23	14	21
40-49	14	21	13	20
30-39	12	19	11	18
20-29	10	16	9	13
10-19	7	11	7	9

Grade Four

Boys. The new standards vastly exceeded the old ones. They began with an increase of four repetitions at the 10th percentile to seven at the 30th percentile and continuing that increment to the 90th percentile.

Girls. The most prominent comparison was the increase of thirteen repetitions for the 90th percentile of the new standards. The new standards got progressively better than the old ones starting with an increment of two at the 10th percentile.

TABLE XI

A COMPARISON OF STANDARD SCORES FOR THE SIT-UP IN GRADE FIVE

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	28	35	24	31
80-89	25	32	21	29
70-79	22	30	19	27
60-69	21	29	18	24
50-59	19	26	16	23
40-49	17	24	14	21
30-39	15	22	13	19
20-29	13	19	11	17
10-19	10	15	8	10

Grade Five

Boys. Beginning with an increment of five repetitions at the 10th percentile, the new standards exceeded the old standard by as much as eight

repetitions at the 60th percentile and seven at the 90th percentile.

Girls. The two standards differed two repetitions (10--old, 12--new) at the 10th percentile. After that, the new standards sharply increased its difference to six repetitions at the 20th percentile and continuing at least this difference throughout the table to a maximum of seven repetitions at the 90th percentile.

TABLE XII

A COMPARISON OF STANDARD SCORES FOR THE SIT-UP IN GRADE SIX

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	29	37	24	32
80-89	25	33	22	30
70-79	23	32	20	28
60-69	21	30	18	26
50-59	19	28	17	24
40-49	17	27	15	23
30-39	15	24	14	21
20-29	13	23	12	18
10-19	9	16	9	13

Grade Six

Boys. The new standards increased in range from seven repetitions at the 10th percentile to an increment of 10 at the 20th and 40th percentile. The difference was eight repetitions at the 90th percentile.

Grade Six

Girls. From an increase of six repetitions at the 10th percentile, the new standards exceeded the old ones by at least that amount and on up to an increment of eight at the 90th percentile.

All of the groups showed very marked increases at all of the levels in the new standards of the sit-up. The new standards generally showed an increment from five to thirteen repetitions which was the 90th percentile of the fourth grade girls.

SHOOT THE CANNON

The shoot the cannon test had a one minute time limit. The pupil had to start in a standing position. The movements sequence was from a standing position to a squat position, then the extension of the legs straight backwards, back up to a squat and finishing to a standing position for one repetition.

TABLE XIII

A COMPARISON OF STANDARD SCORES FOR THE SHOOT THE CANNON IN GRADE FOUR

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	30	32	27	30
80-89	27	30	25	29
70-79	25	28	23	27
60-69	23	27	21	25
50-59	21	25	20	24

TABLE XIII (continued)

Percentile Range	Boys		Girls	
	Old	New	Old	New
40-49	20	23	18	23
30-39	18	22	17	22
20-29	16	19	15	19
10-19	13	16	12	16

Grade Four

Boys. The new standards were consistently better with scores ranging from two to four repetitions more throughout the percentiles.

Girls. The greatest variance was five repetitions (new--22, old--17) at the 30th percentile. The new standards were consistently three to four repetitions higher than the old standards.

TABLE XIV

A COMPARISON OF STANDARD SCORES FOR THE SHOOT THE CANNON IN GRADE FIVE

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	29	32	26	30
80-89	27	30	25	28
70-79	25	28	23	27
60-69	23	26	21	25
50-59	22	25	20	24

TABLE XIV (continued)

Percentile Range	Boys		Girls	
	Old	New	Old	New
40-49	21	23	19	22
30-39	19	22	17	21
20-29	17	19	15	19
10-19	15	16	14	17

Grade Five

Boys. At the 10th percentile, the new standard was one repetition better. It steadily increased its difference to three repetitions from the 50th through the 90th percentile.

Girls. There was a steady three or four repetition increase in the new standards.

TABLE XV

A COMPARISON OF STANDARD SCORES FOR THE SHOOT THE CANNON IN GRADE SIX

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	33	33	26	31
80-89	29	31	24	28
70-79	27	29	22	27
60-69	24	27	21	26
50-59	22	25	20	24

TABLE XV (continued)

Percentile Range	Boys		Girls	
	Old	New	Old	New
40-49	20	24	19	23
30-39	18	22	18	21
20-29	16	20	16	19
10-19	12	17	14	15

Grade Six

Boys. The new standards increased in range from seven repetitions at the 10th percentile to an increase of ten at the 20th and 40th percentile. The difference was eight repetitions at the 90th percentile.

Girls. From an increase of six repetitions at the 10th percentile, the standards exceeded the old ones by at least that margin up to an increment of eight at the 90th percentile.

With the exception of the sixth grade boys, all the groups had better scores throughout the percentile ranges. The sixth grade boys standards started with a variance of five repetitions at the 10th percentile but gradually became closer until they coincided at the 90th percentile.

STANDING BROAD JUMP

The standing broad jump was measured in inches from the take-off line to that point nearest the take-off line where the person's body touched the floor. Each participant was given two trials with the best jump recorded.

TABLE XVI

A COMPARISON OF STANDARD SCORES FOR THE STANDING BROAD JUMP IN GRADE FOUR

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	62	65	57	62
80-89	60	62	54	59
70-79	57	61	51	57
60-69	54	59	49	55
50-59	51	57	47	53
40-49	49	55	45	51
30-39	47	53	43	49
20-29	44	51	41	47
10-19	41	48	37	44

Grade Four

Boys. There was an increase of seven inches for the 10th percentile new standard. The variance decreased to two inches at the 80th percentile and three inches at the 90th percentile.

Girls. The increase in the new standards ranged from five inches at the 90th percentile to seven inches at the 10th percentile.

TABLE XVII

A COMPARISON OF STANDARD SCORES FOR THE STANDING BROAD JUMP IN GRADE FIVE

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	65	73	60	65
80-89	62	69	56	62
70-79	59	68	54	60
60-79	57	66	52	58
50-59	55	65	50	57
40-49	52	62	47	55
30-39	50	60	45	53
20-29	47	58	42	51
10-19	44	54	39	47

Grade Five

Boys. The increase of the new standards varied from seven inches at the 80th percentile to ten inches at the 10th percentile. The 90th percentile standard was raised from sixty-five to seventy-three inches.

Girls. From a minimum increase of five inches for the 90th percentile to a maximum of nine inches at the 20th percentile, the new standard differences were very distinct.

TABLE XVIII

A COMPARISON OF STANDARD SCORES FOR THE STANDING BROAD JUMP IN GRADE SIX

Percentile Range	Boys		Girls	
	Old	New	Old	New
90-99	70	74	61	68
80-89	67	71	58	65
70-79	62	69	56	63
60-69	60	66	54	61
50-59	57	64	52	60
40-49	55	62	50	57
30-39	52	60	48	55
20-29	49	58	46	53
10-19	45	51	43	49

Grade Six

Boys. The new standards showed very distinct changes. These changes ranged from an increase of four inches at the 90th percentile to nine inches at the 20th percentile.

Girls. The new 80th and 90th percentile standards showed the greatest increases. They were seven and eight inches, respectively. Overall, the new standards were much higher than those of the old standards.

All of the new standards were higher than the old standards. The new 90th percentile standards increased from three to eight inches.

SUMMARY AND RECOMMENDATIONS

The North Kansas City Public Schools established a testing program for their elementary physical education curriculum. A test of six items and their standard percentile scores was adopted from a test given by the Kansas City, Missouri School District. This test was to be an aid in evaluating the elementary physical education program in the North Kansas City Public Schools.

Using Kansas City's standards for a period of two years, it was decided to compute the data gathered during these two years of testing and compare its percentile standards to those of Kansas City's. Through these comparisons, it was evident how the North Kansas City children in grades four, five, and six, compared in reference to another district's pupils in the degree of physical fitness. The items included in the physical fitness test were the shuttle run, thirty-five yard dash, push-up, sit-up, shoot the cannon, and standing broad jump.

In the items where the scores were expressed in elapsed time, the top standards (the 90th percentile) were relatively the same. The exception was the shuttle run standards for the fourth and fifth grade girls. The North Kansas City girls were four and three-tenths of a second faster, respectively. In the other percentiles, the North Kansas City pupils had faster times in the shuttle run. These faster times ranged three-tenths of a second or more in most of the percentiles. The thirty-five yard dash standard coincided rather closely in all of the groups.

The push-up showed distinct variations throughout all the grade levels. Generally, in the lower percentiles (the 10th through the 50th), the Kansas City pupils scored slightly higher. However, the upper half of the percentile

(the 60th through the 90th) indicated a distinct change with the North Kansas City pupils' scores being higher. For example, the North Kansas City 90th percentiles showed increases of four to six repetitions above those of the other standard for all of the groups tested.

The greatest variance of scores reported in the testing were in the sit-up, shoot the cannon, and standing broad jump. The North Kansas City pupils excelled in each of these items. The sit-up displayed a difference in scores from two (the smallest) to thirteen (the highest) for all of the percentiles of every group. Even though the variance was not quite as great, the shoot the cannon scores of the North Kansas City pupils were higher in every percentile but one. This was the 90th percentile of the sixth grade boys where both scores were the same. The 90th percentile standing broad jump scores of the North Kansas City pupils were from three to eight inches better than those of Kansas City's pupils. Every percentile score of North Kansas City's in the standing broad jump was better than Kansas City's.

It can be ascertained from the data presented that this group of pupils of grades four, five, and six, in the North Kansas City Public Schools, possessed a higher degree of physical fitness than those pupils of the Kansas City, Missouri School District. Since these results were markedly different, the adoption of the new standards was proposed to help attain validity in the testing program.

Criteria for a good testing program include not only the adoption of relative norms but also it must be valid, reliable, and have economical procedures.[2] New norms have already been proposed to improve the testing

---

[2]H. Harrison Clarke, Application of Measurement to Health and Physical Education (Englewood Cliffs, N.J.: Prentice-Hall, 1965), p. 27.

program. In addition, there are some recommendations that need to be proposed to enhance the overall evaluation program.

Clarke has stated that the function of measurement is to determine status.[3] This is the main purpose of the district-wide test to determine the status of physical fitness.

> The fact that the amount of change in status can be determined by measuring the same individual or individuals after a lapse of time is a highly important factor in physical education, for it becomes possible to measure the progress of the individual, the group, and the school, so that program and teacher efficiency are in turn rendered measurable.[4]

Therefore, instead of administering this test just once a year in the Spring, there should be steps taken to devise a more efficient form of testing. The following are recommendations to make the testing program more efficient.

Abbreviated test. Since the test consisted of six items and took a period of four to six weeks to be administered, there is a need to either 1) shorten the number of items on the test, or 2) increase the weekly time allotment for each class. The increase of time allotments has been a very critical problem because of the shortage of elementary classroom time due to interruptions from other special programs (Spanish, music, art). Also, there has been shortage of funds to employ additional qualified physical education personnel. Therefore, the most feasible solution is an abbreviated test.

The abbreviated test could be administered in one and a half to two class periods; and thus, it could be given three or four times during the year. The advantages would be: 1) more opportunities for evaluation of the current program, 2) to give the teacher an insight into problems encountered by poorer students, and 3) to make a more efficient and economical administering

---

[3]Ibid., p. 29.

[4]Ibid., p. 23.

of the test.

The test has six items to check the following qualities: speed, strength, coordination, agility, stamina, and explosive power. Evaluation of these qualities can be obtained periodically by switching test items back and forth in combinations to satisfy the analysis of the qualities for program-sake and also for environmental conditions such as weather and facilities.

These are the recommendations for combinations. It is important to note that each quality will be tested at least twice a year if that particular test is given twice. The first test consists of the thirty-five yard dash, pull-ups, and the standing broad jump. The second test is the shuttle run, shoot the cannon, sit-ups, and pull-ups. The first test is primarily adapted for the outdoors so it can be given in the early Fall and late Spring. The other test is one which fits ideally into indoor situations where space is a consideration. It could be given in the late Fall and early Spring. All of the gymnasiums in the North Kansas City Public Schools have mounted chinning bars so the first test could be started indoors and finished outdoors in case of one class period of inclement weather.

Addition of the pull-up. The push-up has been eliminated from the recommended testing program and the pull-up has been added. The pull-up is used in almost every major physical fitness test as a measurement for arm and shoulder strength. Thereby, it could give more validity to the evaluation of this strength. Also, the reliability of administering the pull-up can be much greater than that of the push-up because the push-up contains more intricate movements to observe in evaluating its correctness. The more movements that one must observe means the chance of more judgment

discrepancies among individual test administrators. Also, children can more easily understand, learn, and evaluate for themselves the move correctly in the simpler pull-up.

Awards. The current idea of an award is basically good but it only encompasses two or three percent of the school population. At the elementary level, we are dealing with a multitude of developing individuals whose successes and failures are vital to their maturity.

The awards should be broken down into more than one plateau. As previously stated, the student received a certificate of achievement for placing in the 90th percentile in five of the six items on the test. Using the newly computed percentiles, three types of awards could be given out:

1. Excellent performance--those students scoring in the 90th percentile or above in at least five of the six items.
2. Superior performance--those students scoring in the 80th percentile or above in all items.
3. Good performance--those students scoring in the 70th percentile or above in all items.

These awards would be given out for performances on the second session of each type of test. The award could be in the form of designated colored ribbons. This would give each child ample opportunity to attain an award. In schools where there are more than one class of each grade, the results of the first session of each test could be figured on a team basis. This would prevent the overemphasis of individuality and promote group spirit.

Scorecard. The scorecard is the closest thing to a grade card or an evaluation of a child's progress which is given to a child. In order for a child and his (or her) parent to understand the child's particular level of success in these tests, the scores must be expressed in simple "layman" terms and not technical terminology like percentiles. Words of an expressive nature should be substituted on the scorecard in place of the groups of percentiles as follows:

90-99.....Excellent

80-89.....Superior

70-79.....Good

50-69.....Average

30-49.....Below Average

10-29..... Improvement Needed

The above percentile groups are used in standardizing test scores in other subject areas of the North Kansas City elementary curriculum.

The above are recommendations for the improvement of the elementary physical fitness program of the North Kansas City Public Schools. In considering testing methods, we must proceed cautiously in not allowing testing to dominate the program--time-wise and objective-wise--so as to eliminate the fun aspects of physical education. Knapp and Hagman stressed the danger of physical fitness testing when:

> . . . it leads to overemphasis upon development of certain aspects of strength and endurance and general overemphasis upon the physical objectives of physical education with resultant underemphasis upon sport and recreational skills and upon social objectives.[5]

---

[5]Knapp and Hagman, p. 363.

This also means that competition during these testing activities must be closely supervised and kept in the proper perspective of self-motivation and team spirit.

The results of this study and the recommendations herein have been submitted to the elementary physical education department of the North Kansas City Public Schools for their consideration.

BIBLIOGRAPHY

BIBLIOGRAPHY

Clarke, H. Harrison. Application of Measurement to Health and Physical Education. Englewood Cliffs, N. J.: Prentice-Hall, 1965.

Knapp, Clyde, and E. Patricia Hagman. Teaching Methods For Physical Education. New York: McGraw-Hill, 1953.

APPENDIX

HANDBOOK FOR ELEMENTARY SELF-TESTING

35 YARD DASH

Equipment: Stop watch; marked 35 yard course(flat) on dirt field.

Directions: The runner stands behind the starting line. He may start from a standing or a crouched position. The starter should accompany the starting signal "GO" with a downward sweep of his arm for a visual signal to the timer. If two watches are available, it is preferable to have two participants run at a time.

Scoring: The score is recorded in seconds, to the nearest tenth-of-a-second.

PUSH-UPS

Equipment: None.

Directions: The child should lie on the floor, face down, legs together, hands on floor under shoulders with fingers pointing straight ahead. He pushes his body off the floor by extending his arms until he is in a front leaning rest position. He then lowers the body until the chest touches the floor. Body should be kept straight, buttocks should not be raised, abdomen should not sag.

Scoring: The score is recorded for the number of times the movement is executed in a continuous manner, correctly without resting. There is a one minute time limit.

SIT-UPS

Equipment: None. (A mat for each child is recommended)

Directions: The child lies on his back, hands behind neck, fingers interlaced, arms flat on the floor. A partner holds the child's heels on

the floor. The participant sits up, touching both elbows to both knees at once. He then returns to the starting position, making sure the arms are flat on the floor. The fingers must remain in contact behind the neck at all times.

Scoring: One score is recorded for each time the elbows touch the knees in one minute. No score is given if the participant does not have his arms flat on the floor.

STANDING BROAD JUMP

Equipment: Dirt field marked three feet from take-off line in six-inch and one-foot lines. From three to six feet, it should be marked in inches. After six feet, mark it in six-inch lines.

Directions: Child stands with toes touching the take-off line and jumps forward as far as he can. He is allowed two trials. Measurement is made from the take-off line to the point where the back heel touches the ground or to the point where the body or hand touches closest to the take-off line.

Scoring: The score is recorded for the number of inches, jumped to the nearest inch.

SHOOT THE CANNON

Equipment: None.

Directions: From a standing position, the child assumes a squat position with palms of hands on the floor, fingers pointing straight ahead. He thrusts both legs backwards to a front leaning rest position with the body in an inclined plane. He returns to a squat position , then to a standing position. The legs should be thrust backward so that the body is straight. A standing position can be better

attained during the testing by having the child raise his head to look at his partner.

Scoring: The score is recorded for the number of times the participant comes to a position of good posture by completing the exercise in one minute.

SHUTTLE RUN

Equipment: Stop watch; two blocks of wood for each child running; two parallel lines marked on the floor 30 feet apart; both blocks of wood behind the same line.

Directions: On the signal "GO" the child runs to the blocks, picks up one, runs back to the starting line and places the block behind the line. He then runs back and picks up the second block which he carries back across the starting line.

Scoring: Record score to the nearest tenth-of-a-second.

PROFILE OF PUPIL PERFORMANCE ON SELF-TESTING ACTIVITIES

Grade Four - Girls _____
Name of Pupil

Date: _____ Percentile Range	Shuttle Run Timed	35-Yard Dash Timed	Push-ups No. Per Minute	Sit-ups No. Per Minute	Shoot the Cannon No. Per Minute	Standing Broad Jump
90-99	11.2	5.4-	15	21	27	57
80-89	11.4	5.8	12	18	25	54
75-79	11.6	5.9	11	17	24	52
70-74	11.8	6.0	10	16	23	51
60-69	12.0	6.2	8	15	21	49
50-59	12.2	6.4	7	14	20	47
40-49	12.4	6.6	5	13	18	45
30-39	12.6	6.9	4	11	17	43
25-29	12.9	7.0	3	10	16	42
20-24	13.1	7.1	2	9	15	41
10-19	13.2	7.4	1	7	12	37
Below 10	13.3	7.5	0	6-	11-	36-

STUDENT SCORES

SPEED: (Scores expressed in seconds)

Shuttle Run _____

35-Yard Dash _____

STRENGTH, COORDINATION, AGILITY, STAMINA: (Scores expressed in number of times per minute)

Push-Ups _____

Sit-Ups _____

Shoot the Cannon _____

EXPLOSIVE POWER: (Score expressed in inches)

Standing Broad Jump _____

AWARDS

Awards will be given to pupils who have five out of six scores above the 90th percentile.

Explanation of Statistical Methods

Since the Kansas City, Missouri School District standards were arranged in percentiles, it was decided to continue the percentile system for comparison with the old standards, and to maintain a degree of similarity in evaluation for the teachers administering the test. The one major change in the grouping of percentiles was to have all the percentile groups in ranges of 10 than to make distinctions at the 75th and 25th percentile levels as shown in the Kansas City, Missouri standards.

The procedure for collection and compiling of the data is as follows. At the end of each school year (1967-1968 and 1968-1969), the elementary physical education teachers scheduled a meeting to present the scores and the frequency of each in that particular item. After the second year of collecting data, I compiled the two sets of data into one set on the basis of scores and their frequency in separate groups.

The scores were arranged into proper step intervals with precautions to make sure that the intervals were the same in each item for every group of students. For example, the push-ups were in intervals of 3 for all the fourth, fifth, and sixth grades (boys and girls) starting with 0 to 2, 3 to 5, etc.

Through the use of a frequency table using three columns (scores, frequency, and cumulative frequency) the deciles were calculated using the formula, $P=N/10$. P represents the percentile number and N is the number of scores in the entire test of that item. The top and lower one percent of scores in each group were extreme so these scores were eliminated to aid the concentration of the frequency table designed.

A STUDY OF PHYSICAL FITNESS IN GRADES FOUR, FIVE, AND SIX OF THE NORTH KANSAS CITY PUBLIC SCHOOLS

By

WILLIAM JAY STINSON

A. B., William Jewell College, 1966

AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Physical Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1970

Tests are used by administrators in every educational program to aid in evaluating the activities offered in that program. Physical education is no exception.

The elementary physical education department of the North Kansas City Public Schools decided to adopt a physical fitness testing program to give the students some idea of the degree of physical fitness they possessed, and also, to give the department some assistance in determining what the students needs were.

Permission was granted by the Kansas City, Missouri School District for North Kansas City to use six items and their standards from their own physical fitness test of ten items. These six items were the shuttle run, thirty-five yard dash, push-up, sit-up, shoot the cannon, and the standing broad jump. After administering this test to over 15,000 pupils of the fourth, fifth, and sixth grades during 1967 - 1969, North Kansas City decided to establish their own norms if there were differences between the two standards.

This study was derived from the data collected during this testing period and the results have been analyzed. In addition to establishing new standards, recommendations for a better program of testing have been cited from personal experience and research.

In the events where the scores were expressed in elapsed time, the shuttle run times for the North Kansas City pupils were faster while the thirty-five yard dash standards coincided a great deal in both groups. The push-up, sit-up, and shoot the cannon scores were expressed in number of repetitions per minute. North Kansas City pupils scored higher than the Kansas City pupils in the remaining events of the test which were: the push-up, sit-up, shoot the cannon, and the standing broad jump.

It was ascertained from the data presented that the pupils of grades four, five, and six, in the North Kansas City Public Schools possessed a higher degree of physical fitness than those pupils of the Kansas City, Missouri School District.

Since these results showed differences between the standards, the adoption of new standards was proposed to help attain validity in the testing program. Other recommendations were cited in this report to make the testing program more efficient. These recommendations included an abbreviated test, addition of the pull-up, and award system, and a re-designed pupil scorecard.

The results of this study and the recommendations were submitted to the elementary physical education department of the North Kansas City Public Schools for their consideration.